
vw-standards

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The [Tasmanian Polytechnic](#) was formed in January 2009 as a result of the [Tasmania Tomorrow](#) reforms to the Post year 10 Education Sector.

We now provide a wider range of courses for post-year 10 students aged from 15 years and up.

State-wide there are 16 main campuses and about 20,000 students - and a rapidly growing engagement with rural and remote students.

Teachers on individual campuses have been exploring virtual worlds (such as Second Life) for learning since 2007. However this involvement has been patchy largely due to recurrent issues with ICT provision.

ICT Services have recently upgraded and standardised computing services to increase reliability and interoperability across all campuses state-wide.

This standardisation has made it possible to now consider promoting the use of virtual worlds to more learners and teachers.

We are currently involved in a number of virtual world projects with the Tasmanian Department of Education (K-10), the University of Tasmania and others.

Our experience in virtual worlds includes:

- Neverwinter Nights 1/2 for students of all ages (2006-7)
- Second Life for Teacher Professional Learning (2007-10)
- Skoolaborate for students under 18 (2007-8)
- Locally hosted Open SIM for teachers (2009)
- USB Open SIM for students (2009/10)
- Second Life for students over 18 (2010)
- Reaction Grid for students of all ages (2010)

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Goals

Immersive worlds have much to offer the VET Sector in terms of engaging and rich learning environments. However they pose a challenge to learners, teachers and ICT services, institutions and the VET Sector as a whole because of the following characteristics:

- § age restrictions that limit use by classes with students aged 15-20
- § institutional, campus and home ICT service restrictions
- § differences in client software and hardware
- § difficulty in exporting and importing **artifacts** and resources from one virtual world to another
- § difficulty in managing students using multiple virtual worlds
- § difficulty in capturing, storing and displaying evidence for assessment

So while individual projects over the last few years within the institution have demonstrated the effectiveness of immersive learning environments for engaging learners and meeting a wide range of learning outcomes more widespread use has been hampered by the demands on learners, teachers and ICT Services of inconsistencies, barriers and inefficiencies of implementation.

From learner, teacher, institutional and system perspectives we need some standards or guidelines that increase efficiencies in implementation and support and reduce the barriers to access and as a result facilitate the achievement of successful learning outcomes both on and off campus.

Outcomes

This trial will inform the e-standards group and the VET Sector about the best practice of virtual world implementation and use across state-wide multi-campus educational institutions. Teachers and institutions will have a stronger understanding of the available choices, potential barriers and the efficiencies that are achievable in the use of some commercial and open source immersive environments for learning, teaching and assessment. This will bring to a much wider range of learners and teachers a tool that has already shown it can assist in engaging learners, improving 21st century media literacy and promoting creativity and innovation.

Deliverables

1. Report on the research outcomes
2. Evaluation report outlining best practice of virtual world implementation that reduce barriers to access and facilitate the achievement of successful learning outcomes both on and off campus.
3. Recommendations about e-standards that may support the efficient implementation and support of virtual worlds as a reliable and sustainable learning environment.
4. Case study about the processes used for the purposes of this trial for using virtual worlds to engage students in a state-wide multi-campus educational institution.
5. Sample virtual world installations for local hosting and USB memory sticks.

Virtual Worlds as Reliable, Sustainable Learning Environments



Technology Trial: Commercial and Open Source Virtual Worlds

This trial researched current experiences and practices in virtual world projects to develop standards and guidelines to increase reliability, interoperability and reduce access issues for teachers, trainers and learners. The Tasmanian Polytechnic reviewed both commercial and open source virtual worlds to explore issues around information management, security, age and ICT restrictions.


The trial followed an action research methodology informed by the recent and current experience of learners and teachers in the Tasmanian Polytechnic. The research team worked collaboratively with these learners and teachers to design solutions and develop guidelines that meet the needs of learners as well as qualification requirements. The focus will be on organisational requirements as well as reliable and sustainable access to the immersive learning environment.

The research team will also sought the knowledge and advice of recognised experts in virtual worlds and ICT service provision. This helped to ensure that any guidelines developed and recommendations made about possible e-standards were current national best practice as well as being achievable in large learning organisations.

The intention was that recommendations from this project about the use of virtual worlds as immersive learning environments be used by educators wishing to implement them and others involved in the development or updating of e-standards as applicable.



E-standards for Training through the Australian Flexible Learning Framework, made funding available to registered training organisations (RTOs) for the trialling of emerging technologies. The purpose of this funding was to explore emerging technologies and identify areas where future standards work may be required. ([Read more](#))

Download this report:  [vw-standards.pdf](#)

Download Issues and Possible Strategies Summary:  [Strategies virtual worlds.pdf](#)

This Technology Trial was completed 1st October 2010 (although the wiki may continue to be updated)

This page is located at <http://vw-standards.wikispaces.com/>

International Working Groups on Standards in Immersive Worlds

JISC CETIS

[JISC CETIS - Virtual Worlds](#) - Supporting Innovation and Interoperability in Virtual Worlds

MediaGrid

Immersive Education standards are developed through Technology Working Groups (TWG). TWGs develop, deliver and maintain technological materials such as technical reports, design documents, specifications, reference implementations, software implementations, conformance test suites, best practices, and reviews of deliverables produced by other TWGs.

All TWGs follow a formal standardization process ([PDF](#)) and produce open and royalty free standards that conform to the Media Grid Intellectual Property Policy. Visit <http://MediaGrid.org/groups> for a full list of iED TWGs and membership details.

[MediaGrid - Open File Formats Technology Working Group](#) - OFF.TWG is responsible for defining, evolving and maintaining open, platform-neutral file formats that enable learning objects and experiences to be seamlessly deployed across Immersive Education technology platforms.

[MediaGrid - Library Technology Working Group](#) - LIB.TWG is responsible for defining, implementing, evolving and maintaining applications and open standards related to the provision of library services associated with Immersive Education.

Web-to-World Project - [Video](#) The new "Web-to-World" (w2w) content authoring capabilities that have been prototyped greatly simplify the process of placing content and reference materials into virtual worlds. Anyone with a standard Web browser (Firefox, Internet Explorer, Safari, etc.) can now populate a virtual world with hyperlinked whiteboard imagery and 2D images, and soon 3D objects as well, using only their Web browser: no virtual world building or authoring skills required.

[MediaGrid - Immersive education Technology Group](#) - IETG is responsible for defining open standards and best practices for a new form of computer-based learning that combines collaborative online course environments and classrooms with interactive 3D graphics, commercial game and simulation technology, virtual reality (VR), voice chat (Voice over IP/VoIP), Web cameras (webcams) and rich digital media.

This is a register of issues that have arisen as educators attempt to use virtual worlds for learning, teaching, assessment and communication. The focus of these issues is to increase reliability, reduce access issues and improve the interoperability of virtual worlds.

Please add your own issue and possible solution if you have one...

Leave your contact details if you don't mind us seeking further information.

Previous work on issues associated with using virtual worlds in education:

- [Virtual Worlds - Real Learning Project](#) - Australian Flexible Learning Framework (GippsTAFE)
- [Immersive Learning: Challenges for Education](#) - education.au

Issue	Possible solution(s)
Access: Firewalls A complex process to open firewalls may be required. This process takes time and ongoing access is susceptible to changes by multiple services providers.	A. Negotiate to open firewalls well ahead of time and stay informed of any changes in ICT and virtual world service provision. B. Establish good relationships with ICT and virtual world service providers. C. Consider using independent 3G wireless access while evaluating services for educational use. D. Consider establishing a virtual world inside your firewall or even on local computers. E. Consider using student access from home. Research & Recommendations
Access: Bandwidth Broadband speeds are generally required for a satisfactory user experience.	A. Consider the bandwidth required when setting up or choosing areas in virtual worlds - keep the number of prims and scripts down. B. Reduce the requirement to travel to new areas in virtual worlds. Many educational tasks do not require much bandwidth once you have arrived at a site. Research & Recommendations
Access: Voice Some ICT services will not open the firewall to in-world voice communication due to security concerns.	A. Consider using Skype or alternative VOIP service if available. B. Consider using voice from home if possible. C. Some institutions use alternative proxy/Internet software to overcome security concerns with voice. Research & Recommendations

Access: Costs

Initial and on-going costs.

A. Refer to cost comparisons
B. Commercial vs Open Source
[Research & Recommendations](#)

Access: Age of user

After December 2010 Second Life will be restricted to over 16s (currently over 18) with special educational access for 13-15 year olds. Teen Second Life for 13-17 years will be discontinued after Dec 2010.

A: Use alternative and appropriate virtual worlds with no age restrictions such as Reaction Grid.
B: Second Life has announced (14th Aug 2010) a new policy where Second Life will be open to those aged 16+ (implementation date after Dec 2010). This will greatly assist post year 10 educational institutions.

Hardware: Server Options

Hosting options

A. Hosted externally - refer to options
B. Hosted internally - pros and cons - costs
C. Hosted on USB memory - pros and cons
[Research & Recommendations](#)

Software: Client/Viewer choices

A range of clients are available for user access to virtual worlds.
Minimum hardware specifications are required for acceptable viewer performance. Increased hardware specifications are required for some tasks such as making in-world video (machinima) or design work involving fine detail.

A. A number of factors affect the choice of client. How are the client applications being deployed? What clients are being used at home? Which virtual worlds are being accessed? Is access to multiple grids required? What OS is being used? What are the hardware specifications? Is help documentation tailored for a particular client?
[Research & Recommendations](#)

Assessment: Capturing Evidence

How do students and assessors capture evidence for assessment?

A: There are a number of ways to record activity in virtual worlds
B: Be clear about learning processes and desired outcomes.
[Research and Recommendations](#)

Transferability: Backup & Importing/Exporting Objects

Objects: Some viewers allow owner created objects to be exported (back-up) from one world and imported to another. Note that copyright and Terms of Service rules apply. When importing at destination, check there is enough room and prim allocation, don't fly and include textures unless applying them manually.
[Research & Recommendations](#)

Implementation: Hypergrids

What are they and why use them?

[Research & Recommendations](#)

Implementation: Volatility and Investment of Resources

[Research & Recommendations](#)

How much time is worth investing in immersive environments and supportive learning resources if they change or are superseded?

Implementation: Getting Started

[Research & Recommendations](#)

How can a teacher or students get started in virtual worlds when they are so different that it takes a large investment in time?

Implementation: Policy

[Research & Recommendations](#)

What new policies are needed for staff and students to use virtual worlds?

Implementation: Pedagogy Which learning and teaching approaches suit virtual worlds?

[Research and Recommendations](#)

The communication and documentation strategy for this project will have three main phases:

1. during the project
2. at project completion
3. post-completion

During the project will focus our communication for three main audiences; internal to our organisation, professional communities of practice inside and outside the organisation, and the wider VET Sector.

Online project spaces will be developed that will include the use of wikis, blogs, micro-blogging (**#VWstandard**), screen casting, audio and video. These will have RSS feeds to enable subscription by stakeholders and others interested in this project.

Within our organisation communication will focus on developing and maintaining support for the project within the project team, the Flexible Learning Team, and the students and teachers participating in the trials. This communication will include online project documentation using a variety of media including audio and video that will capture evidence related to the project goals. This evidence will also be captured inside virtual worlds.

Online project documentation will be visible by professional communities of practice consisting of educators who use virtual worlds. This will hopefully encourage ongoing interest and participation in project discussions and perhaps extend to some collaboration. Expert information and advice gained from project consultants in face-to-face and online discussions will be recorded, summarised and shared in the project's online documentation space.

This project will inform and tap into the collective wisdom of virtual world communities of practice. This will enable solutions to be developed collaboratively and, if these solutions are recognised as valuable and effective, help to promote the use of virtual worlds for educational purposes.

A project report identifying the key findings and recommendations based on the 2010 trial will be prepared and presented to E-Standards for Training.

Evaluation will be an integral part of this trial and is expected to include:

- § accessibility of virtual world learning resources and artefacts (export/extraction, interoperability, adaptability, adaptation for sharing)
- § technical skills needed (initial design, development and implementation, export/extraction)
- § sustainability and reliability (hardware and software requirements, ICT service requirements)
- § success in meeting the needs of learners and teachers for a reliable and flexible environment

Interviews and targeted surveys will be used to gather this data from all project team members, learners and teachers using virtual worlds for immersive learning environments.

Issues explored in the technology trial

Key issues that were explored from a standards and strategy point of view are

- § **Internet access** (bandwidth and data volume, firewalls, security and safety policies)
- § **Virtual world services or installations** (initial and ongoing costs, reliability, backup, helpdesk service)
- § **Hardware/Software** (browser/client choices, operating systems, minimum hardware requirements, voice communication)
- § **User access** (on/off campus, regional access, national and international collaboration, user guidelines)
- § **Learning artefacts and education resources** (import/export, transferability)
- § **Assessment** (recording/capturing text, audio, video)
- § **Seamless integration** (hyper-grids, age restrictions, privacy/security)

This project sought to inform the development of standards or guidelines for the use of virtual worlds as a reliable and widely accessible learning environment for teachers and students.

Within our organisation there is a growing interest in using immersive learning environments and a number of individual projects in various virtual worlds have been completed in the last few years. From an institutional perspective the relative merits of different virtual world services, installations and their interoperability needs to be mapped and a coherent strategy developed so that students and teachers can clearly see how virtual worlds may be reliably and flexibly used in their learning and for assessment. For this to be effective we need to explore what standards may be necessary to increase student and teacher access, improve virtual world reliability and facilitate the import and export of learning artefacts and teaching resources from one virtual world to another.

The project sought to answer these questions by building on previous virtual world project experience while engaging with current virtual project teams to explore the potential for some standardisation in the implementation of virtual worlds for learning and an emerging common understanding of issues faced by learners, teachers and assessors.

Research: Assessment

Assessment: Capturing Evidence

There are a number of ways to record activity in virtual worlds and these are outlined below. Before considering these it is worth being clear about learning purposes and desired outcomes.

Learning, teaching and assessment in virtual worlds brings new opportunities and challenges.

See [Transforming Assessment - Rethinking assessment in a participatory digital world - Assessment 2.0](#)

- [Second Life](#)
- [Sloodle](#)

Blogs and ePortfolios

It is worth considering using Blogs, FlickrR, or ePortfolios for learning and assessment because it is fairly easy for students to capture evidence of their learning in an immersive environment. These tools also support reflection, comment and sharing which can complement participatory and collaborative educational approach that might be taken in immersive worlds.

Text Chat

Text chat can be captured by copy/paste of a section from the open chat window or by accessing chat logs that have been set up in 'Preferences' --> 'Communication' (consider carefully if and where chat logs are to be saved). See video: [Where are my chat and IM logs stored?](#)

Chat Bubbles may be a useful feature - see Video: [Chat bubbles](#)

Screenshots

Screenshots can be captured **using the inbuilt viewer 'snapshot' tool**, the 'snipping tool' for Windows Vista/7 users, or the screen capture function in a graphics package. [Fraps](#) will also record screenshots.

If uploading screenshots to blogs or ePortfolios it is worth knowing how to crop and resize them. Picture Manager does this easily for Windows users (on screenshot in folder right-mouse-click --> Open With --> Picture Manager)

Audio

Second Life and some OpenSim regions have voice chat but these may or may not be accessible through

institutional firewalls.

[Skype](#) - Skype is useful for voice where voice has been blocked or is not available. It has a number of functions that can be used to facilitate learning and record assessment evidence.

- voice recording (independent of the virtual world)
- file transfer
- screen sharing
- calls to phone/mobile

Some virtual worlds have 'Skype Badges' or other scripted tools to facilitate in-world dialogue with nearby avatars.

For local/hosted OpenSim worlds without voice consider using [Mumble](#) and [Murmer](#) or [Whisper](#) For more information see [Whisper - New Voice Solution for OpenSim](#)

[Fraps](#) and other screen capture applications can record audio (eg Skype) with video.

Video

Software

[ScreenR](#) - for quick web-based screen capture

[Jing Pro](#) - Screen capture - high quality (up to 15 frames per second) with small file size - but can't use Space Navigator so panning/zooming are not as smooth.

[Fraps](#) - Real-time video capture with high frame rates - works with mouse or [Space Navigator](#) with FlyCam

Picture: Using Jing to record video of part of viewer screen



User Interface switches for recording video (machinima) (may vary in different viewers)

- User Interface (UI): CTRL + ALT + F1
- Heads Up Displays (HUDs): SHIFT + ALT + H

Video sizes and editing

You can record any size screen but for uploading to the web (eg YouTube) it often looks better in 16:9 format.

If you are using Fraps this means manually resizing your viewer to 1280 x 720, 800 x 450, 640 x 360... (check viewer size in Preferences --> Graphics)

Video editing can be done in most video edit applications.

[Camtasia Studio](#) integrates with Jing Pro and comes with hosting at Screencast.com which is particularly useful if YouTube is blocked at an institution. ([Blip.TV](#) is also useful.)

Hardware

Panning and zooming can be done with a mouse (using <CTRL><ALT>) but a joystick or [Space Navigator](#) is much smoother.

In the viewer go to Preferences --> Input and Camera --> Joystick Setup. There is a button for the Space Navigator default setup.

[Space Navigator](#)



Drivers: [3Dconnexion](#) and [viewer setup](#)

Recommendations for possible Guidelines/Standards

- Be clear about learning purposes and desired outcomes.
- There are many ways to capture evidence of learning processes and performances of understanding in virtual worlds.
- Facilitate students to capture evidence and reflect on learning.
- Be prepared to acknowledge students who gain understanding, knowledge and skills in areas not directly related to your identified learning outcomes.
- Allow students to learn and reflect through play.

Research - Bandwidth

Broadband speeds are generally required for a satisfactory user experience.

To reduce the bandwidth required consider

- which regions you visit in virtual worlds - avoid those with large prim counts or excessive scripts running
- reducing the requirement to travel to new regions
- selecting the option to disable streamed media if it's not required
- using text chat instead of voice
- the nature of the tasks to be done - tasks such as building often do not require much bandwidth
- viewer settings - see videos below and [Second Life Wiki - Reducing Lag](#)
- hardware requirements - see [Second Life - System Requirements](#)
- the time of day and other demands on a network

Because there are so many factors that affect user experience in immersive worlds such as Second Life or reaction Grid it is not possible to make recommendations about how many users can be online at the same time nor what bandwidth is required for an institution. Some institutions have had up to 25 students in one computer lab successfully use Second Life or Reaction Grid while others struggle to get even a few running.

Sometimes the use of virtual worlds isn't considered possible in an educational institution because required **Data volumes** are thought to be very high however this is often over-estimated for students engaged in learning tasks at one location in a virtual world.

Access using a **USB broadband wireless modem** is a viable possibility provided the above options for reducing required bandwidth are observed.

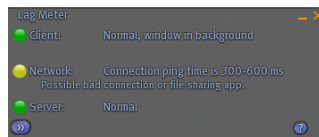
For high speed USB broadband wireless modems (eg [Telstra Turbo](#)) it is even possible to **network a few laptops** from a travel router such as the [Netcomm 3G Travel Router](#).

Viewer Tools

A better approach is to use some of the tools built into viewers to determine the possible causes of poor performance for particular locations - physical and virtual.

Even so interpreting the data can be difficult. One institution regularly had indicators that went red but the user experience was OK for most tasks most of the time when the quality and performance slider (see below) was moved to the left.

The **Lag Meter** (Help --> Lag Meter) is a very good place to start. [Second Life Wiki - Reducing Lag](#)



The Client indicator may go red when the avatar teleports or looks around a location but should come back to green.

Ping times above 300msec are not necessarily a problem if they don't persist.

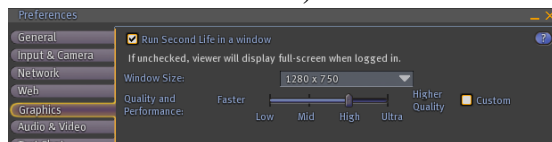
Server indicator may be red for Reaction Grid but that is not necessarily a problem.

Videos:

[Learn the Lag Meter - Second Life](#)

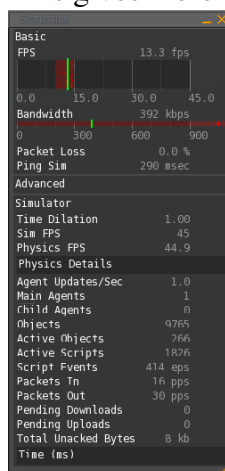
[Second Life: How to easily boost viewer performance](#)

Graphics settings can be easily altered to change client quality and performance (this is done automatically on login but is worth checking if there are performance issues or the graphics card was unknown to the viewer).



Statistics Bar (View --> Statistic Bar) See [Second Life Wiki - Statistics Bar Guide](#)

This gives more information for those who like to delve deeper :-)



Bandwidth used will rise after a teleport and will then reduce as the scene appears.

Packet loss may indicate network issues.

See also Testing speeds

- iliveis - [my ping-a-ling](#)

Recommendations for possible Guidelines/Standards

- Design learning activities to suit available bandwidth.

- Use existing viewer tools to improve quality and performance.
- Consider implementing a local (inside firewall) instance of OpenSim (with possible Hypergid access to external virtual worlds).
- Consider desktop or USB instances of OpenSim for building and design tasks not requiring multi-user access.

Research - Costs

The following table provides a guide to help estimate possible costs involved in implementing virtual worlds for education.

Where possible collaborate with other educational institutions and share access to virtual worlds and educational resources.

See [Second Classroom: Educators Learning in Virtual Worlds](#)

Item	Required?	Likely Cost
Internet access		
Computers - need sufficient RAM and suitable graphics capability		
Support staff		
User access		
Region or Island annual fee		
Hosting annual fee		
Purchasing virtual items		
Customisation		

Hosting fees vary considerably and are dependent on the type of service being provided - shop around. Some examples:

[Second Life Education](#)

- [Basic accounts](#) are free
- [Developed Land](#) and [SL Invoiced Island Order Site](#) (Prices shown) NB [Change in education pricing from Jan 2011](#)
- [Educational Institutions in SL Directory](#)
- [JokaydiaGrid Rentals](#) in Second Life (Prices shown)
- [Solution Providers](#)

[Reaction Grid](#)

- Accounts free
- [Hosting](#) and [Self-Hosting](#) (Prices shown)
- [JokaydiaGrid Rentals](#) in Reaction Grid (Prices shown)

[Sim Host](#)

- [OpenSim Hosting Packages and Prices](#) (Prices shown)

List of [OpenSim](#) hosting providers

Recommendations for possible Guidelines/Standards

- Choose cheaper options initially that allow for later expansion, and shop around. Consider open source solutions such as OpenSim.
- Where possible collaborate with other educational institutions and share access to virtual worlds and educational resources.
- Join a community of Australian educational institutions using virtual worlds.

Research - Firewalls

Access to virtual worlds from within firewalled networks that also require proxy authentication can be a long and difficult process.

Firstly an accurate up-to-date list of the required TCPs & UDPs with Ports are needed from each virtual world service (eg Second Life and Reaction Grid)

Because these can change over time a process needs to be put in place to maintain up-to-date lists. (eg subscribe to updates from each service)

Secondly these TCPs & UDPs with Ports must be opened if blocked. This may need to be done by both the ISP and local network managers.

These processes can take months to negotiate and are facilitated by:

- good relationships with local ICT staff and external virtual world service providers
- buy-in from local ICT staff, administrators and curriculum/learning managers
- well documented business and education cases (including risk management)

Alternative access may be useful for demonstration or pilot projects with small numbers of users. This can be organised by using 3G wireless access through mobile phones or pre-paid wireless broadband USB devices where coverage is available. In addition a travel router may provide small wireless networks for a few laptops.

Access to in-world voice chat may be difficult to arrange. Some educational institutions have solved this issue and this is currently being investigated. Voice chat alternatives such as Skype may be considered if voice is required. Some virtual worlds have 'comms-badges' to facilitate the use of Skype with avatars.

Recommendations for possible Guidelines/Standards

1. Allow several months to resolve access issues at an institution.
2. Consider alternative network access or local installs of OpenSim (including [OpenSim on a USB memory stick](#)).
3. Develop some national guidelines for ICT staff concerning firewall security and access to learning technologies.

Research - Getting Started

Issue: How can a teacher or students get started in virtual worlds when they are so different that it takes a large investment in time?

Virtual worlds are a very different kind of learning environment - particularly for those who have not played immersive games involving the use of avatars.

Advice about how to get started in a virtual world is varied but some common suggestions are

- visit a virtual world for the first time with someone who can introduce you to its basic features and alert you to potential pitfalls
- play in a virtual world before thinking about using it with students for learning
- visit virtual worlds which have well developed educational communities, help videos and documentation
- experience virtual worlds and resources purposely built to meet particular learning outcomes

Some methods for facilitating new teachers using virtual worlds with their classes

- arrange for an experienced teacher to take the class while the class teacher participates as a learner
- arrange for an experienced facilitator to join the class 'in-world' to help students
- encourage students to assist each other - some usually find it easier than others
- produce some quick 'how to' screencasts for students (eg using [Jing](#), [Screenr](#), [Camtasia](#)) and look online for many that already exist (eg YouTube)
- allow students time to A) Personalise their avatar B) Learn to interact with the virtual environment C) Learn to interact with other avatars

Getting started in an educational institution

Accessing a virtual world in an educational institution often requires more than just installing a client and registering for an account. ICT, admin and management support is often required as well as collaboration with colleagues. Engaging key stakeholders with [information, research and stories](#) about why virtual worlds might be used within the organisation can be an important step. Without 'buy-in' from key people in an organisation progress is likely to be slow.

Using virtual worlds in education

- [Immersive Learning: It's Game On](#)
- [jokaydia wiki: Educational Uses of Second Life](#)
- [RezEd](#)
- [Practical Examples of 3D Virtual Environments for Learning in High School](#)
- [jokaydia wiki: Getting Started in Reaction Grid](#)
- [Greenbush Labs](#) See [Projects](#)

- [Kindlelab](#)

Educational Uses for Virtual Worlds

Second Life

- [Second Life Education Wiki](#)
- [Second Life as a Virtual Learning Environment](#)
- [Educational Uses of Second Life](#)

Australian Networks of Educators using virtual worlds

- [Second Classroom: Educators Learning in Virtual Worlds](#)
- [Exploring the Metaverse: Virtual Worlds and Games for Learning](#)
- Search for groups inside virtual worlds

Further Reading



[Virtual worlds - Learning in a changing world](#)

by Judy O'Connell and Dean Groom

Emergence of virtual worlds

Learning in the metaverse

Tools and techniques

Making the transition

Recommendations for possible Guidelines/Standards

- Consider starting slowly and learning with students.
- Use the extensive range of existing help documentation and videos found online.
- Identify and encourage students who can help others as early as possible.
- Encourage students to source or produce their own help documentation.
- Consider producing quick 'how to' screen captures customised for local needs.

- Join a learning network with other educators using virtual worlds.
- Allow time for play within a structured learning plan.

Research - Hardware and Hosting

There are a number of ways to implement virtual worlds for learners to access.

- join existing externally hosted virtual worlds (eg [Second Life](#))
- rent regions in existing externally hosted virtual worlds
- create your own virtual world on a virtual server through a hosting provider via '[Remote Desktop Services/Connection](#)'
- create your own virtual world on a physical server through a hosting provider via '[Remote Desktop Services/Connection](#)'
- create your own virtual world on your own local server
- create a single user virtual world on a USB memory stick

Regions for Rent

- [Second Life](#)(USA) (Open to 16 and over after Dec 2010 and [access to education sites for 13-15](#))
[NB Change in education pricing from Jan 2011](#)
- [Teen Second Life](#) ([Discontinued after Dec 2010](#))
- [Reaction Grid](#)(USA)
- [Jokaydia Grid](#) and [Jokaydia Grid Rentals](#)(Australian Educator)

External Hosting Options

- [Reaction Grid](#)
- [SimHost](#)
- List of [OpenSim](#) hosting providers

Inhouse Hosting Options

- [OpenSim](#) - Local Server, Desktop, USB
- [**Diva Distribution**](#)- [Metaverse Ink](#)([Introduction](#) and [Installation Wiki](#)) See also [Hypergrid Business: How to set up a mini-grid](#) ([Includes Wifi web app for user registrations](#))
- [USB Standalone for Windows](#)
- [KindleLab](#) - OpenSim + SnowGlobe Viewer + Google Docs (download zip file)

Some views on hosting

- [Hypergrid Business: How to choose an OpenSim hosting company](#)
- [Hypergrid Business: OpenSim Security 101](#)
- [Hypergrid Business: How to set up a mini-grid](#)
- Adam Frisby - ["How to choose a good OpenSim host?"](#)

- [iliveisl: "we get groups..."](#)
- ilivesisl: [The Future of Education in Virtual Worlds](#)
- iliveisl: [multi-sim suggestion, especially for educational use](#)

Recommendations for possible Guidelines/Standards

- Start by exploring existing virtual worlds and using 'sandboxes'.
- Establish a presence by renting a region in an existing virtual world.
- Establish a team with strong ICT support before considering hosting own virtual world.
- Consult educator communities in virtual worlds when looking for a hosting solution that meets needs for privacy, reliability, price and performance...
- Consider implementing a range of complementary services at your institution including using open source software. For example existing virtual worlds, standalone installations, USB memory stick installations, local network, hosted OpenSim providers.

Research - Hypergrids

Hypergrids connect grids so you can teleport to another grid effectively supporting the emergence of a Web of virtual worlds - a 'Metaverse'.

Read more - [The OpenSim Hypergrid](#) and [Hypergrid Business: Hypergrids](#)

Directory of Hypergrid Destinations - [Hyperica](#) (See above links for more)

The [Diva 2 Distribution](#) has hypergrid functionality.

Recommendations for possible Guidelines/Standards

- Consider linking individual virtual worlds through hypergrid technology.

Research - Pedagogy

Which learning and teaching approaches suit the use of virtual worlds in education?

Anecdotal evidence suggests that teachers who successfully use virtual worlds with students are comfortable with the following

- Giving students control of their own learning - giving students choice and responsibility and allowing them to make mistakes
- Learning through play - allowing students to play 'off-task' so they can build skills while getting used to the environment
- Defined tasks - structures learning with some defined tasks, clear purposes and goals - preferably negotiated
- Active facilitation - helps students to assist each other; in-world facilitation
- Teacher as learner - learning with students; happy to let students lead; does not need 100% understanding to proceed
- Excursion attitude - taking students and self out of classroom comfort zone; taking risks
- Not bound by content delivery - allows time to establish desired learning processes;
- Student engagement is a priority - student centred approaches
- Back-up in case technology fails - has a meaningful back-up plan if technology suddenly fails temporarily

The above teaching dispositions are often found in the following approaches to learning

- [Problem-based learning](#)
- [Project-based learning](#)
- [Enterprise-based learning](#)
- [Student-directed learning](#) (Inquiry-based learning, self-directed learning)
- [Interdisciplinary learning](#)

See [Creating a Virtual World Mindset: A Guide for First Time Second Life Teachers](#)

This practical guide is for individuals who want to create effective SL teaching and learning experiences.

See also [Quest-Atlantis-Teaching: Tips for Implementation](#)

Examples of where virtual worlds might be used for learning - see also [Getting Started](#)

- Role play – shop assistant
- Social – dance, play
- Exhibition and performance – creative and performing arts
- Scenarios – Occupational Health and Safety
- Conversations – languages

- Building – 3D geometry
- Business – environmental management
- Community – class, group, organization
- Cultural Awareness – contemporary, historical
- Story telling – machinima
- Theatre – lighting
- Simulations – heart
- Pedagogical (Learning) agents – historical characters

Recommendations for possible Guidelines/Standards

- When considering which teachers to invite to use virtual worlds look for complementary learning and teaching approaches such as collaborative learning, student-directed learning, problem-based learning, project-based learning or enterprise-based learning.

Research - Policy

Issue: What new policies are needed for staff and students to use virtual worlds?

This issue has the potential to delay the implementation of virtual worlds for learning by weeks or months.

An institution's response to this issue will depend on the nature of existing ICT and Duty of Care policies.

Institutions that are working with students under 18 years of age (and even with adults) need to be aware that existing Internet filters do not filter content inside virtual worlds (nor do they usually filter content inside participative social web services). However, most service providers of virtual worlds of interest to educators have their own Terms of Service (ToS) that restrict 'adult only' content - particularly those virtual worlds with existing communities of educators. Reaction Grid for example stipulates a ['PG Rating' in their ToS](#).

Some institutions with students aged 16 years and older require students to participate in induction sessions where potential issues of inappropriate content and how to deal with it are discussed. Other institutions with students under 18 years of age require parental permission forms and sometimes parental information sessions.

Some institutions may require a formal business plan with detailed risk analysis and mitigation strategies.

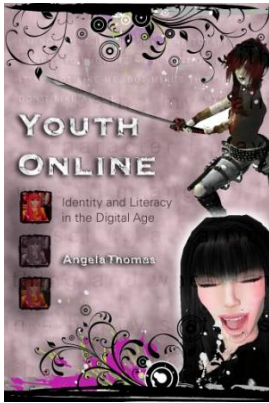
Some institutions require special ICT policies for the staff and student use of virtual worlds while others refer users to existing general ICT Acceptable Use Policies.

Some specific virtual world policies and guidelines

- [Schome Park AUP](#)
- [Linden Lab's Teen Second Life 'Commandments'](#)
- [PacificRim Exchange](#)
- [Teen Second Life - Advice to Parents](#)
- [Skoolaborate](#)
- [Quest Atlantis](#)

Further Reading

-



[Dr Angela Thomas](#), University of Tasmania

[Youth Online: Identity and Literacy in the Digital Age](#)

Recommendations for possible Guidelines/Standards

- Consider the possibility that existing ICT Acceptable Use Policy (and behaviour management policy) may be sufficient.
- Induction sessions for staff and students are highly recommended - as are voluntary information sessions for parents of younger students.
- Consider producing information sheets that address frequently asked questions.

Research: Software - Viewer choices



Second Life Viewers

[Main Linden Lab Viewers](#)

[Third-Party Viewer Directory](#) - 11 viewers for desktops, laptops and mobile phones (iPhone)

[Third party viewers](#)- 28 viewers (some discontinued) - graphical and text based - desktop and mobile phone (iPhone)

Linden Labs (Second Life) have a [Third-Party Viewer Policy](#) which permits the use of third-party software to connect to Second Life from any device and allows modification or use of their viewer source code under certain conditions.

Reaction Grid Viewers

The above viewers are either designed to be used on different grids or can be adapted to do so and instructions on how to do this are usually found on the respective Grid's website. Be aware that adapting Second Life viewer shortcuts to access other virtual worlds may be difficult to manage with some desktop settings.

Viewers tested for this project

[Second Life Viewer 2](#) - Official viewer and the one users are most likely to load at home. It is difficult to use to connect to other virtual worlds/grids because it requires a customised desktop shortcut (instructions can usually be found on help pages for various virtual worlds).

[Second Life Viewer 1.23](#)(Download link at bottom of page) - Older viewer (See [Viewer 2 Moves](#) for changes to menu structure from viewer 1.23 to 2). It is difficult to use to connect to other virtual worlds/grids because it requires a customised desktop shortcut (instructions can usually be found on help pages for various virtual worlds).

[Hippo Viewer](#) - two part download the second of which may not download through a firewall or unauthenticated proxy

[Imprudence](#) - very useful and recommended. Can be installed on a USB memory stick.

[Emerald Viewer](#) - (Discontinued for Second Life)

Meerkat (Discontinued)

Sparkle (iPhone) - text based (Download via iTunes)

Pocket Metaverse (iPhone) - many features with some map graphics (Download via iTunes)

Observations

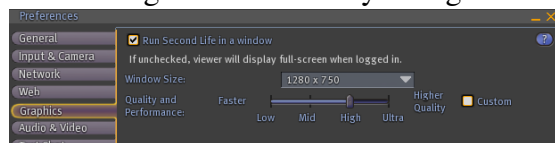
Viewers designed for use on multiple grids are useful when more than one virtual world is being used. Viewers that allow owner created content to be backed up (exported) and imported into a different virtual world is useful for users using more than one virtual world. (NB Copyright considerations.)

Viewers for smart phones are useful for quick messaging or transactions.
Some viewers may be difficult to deploy on across some networks.

Viewer Quality and Performance

The quality and performance of a viewer is usually automatically selected on startup when the viewer examines computer specifications.

This setting can be manually changed - see [Bandwidth: Viewer Tools page](#) for more information.



Hardware Interfaces

Web Browser Access (Near future)

See [Rezzable: Unity and the On-Ramp to the OpenSim Metaverse](#)



The above login and view is via a standard browser with a plugin.

It is possible to have a virtual world (Unity 3 not OpenSim at present) hosted (eg [Reaction Grid Jibe](#)) and to design and export objects and terrain from [Unity 3](#).

Virtual worlds of this kind may be well suited to meetings and exhibitions in the short term and much more in the near future.

Text and voice chat are possible.

Some institutions may not be able to access these virtual worlds from a web browser due to ICT restrictions in place.

This technology is new and likely to develop rapidly.

Recommendations for possible Guidelines/Standards

- Consider using the Impudence Viewer if you are planning to use virtual worlds other than Second Life.
- Consider manually changing graphics settings to suit computer specifications and bandwidth.

Transferability: Importing/Exporting Objects

Research has begun on **exporting and importing objects** using a viewer, application software and 'sculpty' image maps. A large hotel (owner created) has been successfully exported from Second Life and imported into Reaction Grid for Hospitality and Tourism students to use for simulations and roleplay.



Hotel transferred to Reaction Grid

Transferring objects from one virtual world to another

This can be useful for

- building the same learning tasks or environments in multiple worlds
- allowing students to build off-line in a stand-alone USB or desktop virtual world and then import to a 'live' shared virtual world
- backing up objects for archiving and/or assessment

Some viewers allow owner created objects to be exported (back-up) from one world and imported to another. Note that copyright and Terms of Service rules apply here. When importing at destination, check there is enough room and sufficient prims allowance. Don't fly while importing and include textures unless applying them manually.

Transferability via Creation in External (out-of-world) Applications

Sculptured prims (sculptys) can be created as RGB (sculpt) maps in external applications such as [Blender, 3D Max or Plop](#) and then uploaded into different virtual worlds. This may be a more useful approach than exporting and importing from one virtual world to another.



Item imported as a 'sculpty map' into both Second Life and Reaction Grid. Textures and scripts (sit) were applied in-world.

For more on scripts see [iliveis: copy of scripts into notecard for intergrid use](#)

Single or linked prims and textures can be exported from Google SketchUp using [SketchLife](#)

Transferability via Inventory Backup

Software such as [Stored Inventory](#) allows the user to backup their inventory (objects, skins, textures, scripts) and to transfer owner created items to another compatible virtual world.

Archives - IARs and OARs

[OpenSim Inventory Archives \(IARs\)](#) are a means by which inventory folders and items can be saved offline to a single file (an IAR). This file can then be loaded into a different OpenSim installation. See [iliveis: IARs - inventory backup files](#)

[OpenSim Archives \(OARs\)](#) save all the necessary asset data so that you can fully restore the terrain, the textures of objects and their inventories when loaded onto a completely different system using a different asset database. See [iliveis: OAR backups plus a bonus science lesson](#)

Watch an OAR file load (filmed at double speed) by [iliveis on YouTube](#)

Terrains, Regions and Objects

See [Hypergrid Business: Where can I get terrain, region files, buildings and other content?](#)

[MyOpenSim: OAR Files](#)

[OpenSim Worlds](#) - OpenSim archives can save all the necessary asset data to fully restore the terrain, the textures of objects and their inventories.

Mesh Import

Mesh import will allow 3D 'mesh' files exported from Google SketchUp, Blender, 3DMax... to be uploaded to a virtual world.

Among other possibilities it means that student work produced in these applications can be exhibited in a virtual world.

Mesh import into SL will soon (September 2010) be possible (and OpenSim soon after that) - see [Second Life Blogs: Next Steps for Mesh Import](#)

Recommendations for possible Guidelines/Standards

- Consider the possibility of moving owner created objects from one virtual world to another, including standalone/USB based installations.
- Consider the possibility of moving region terrains, objects and scripts (OAR files) from one virtual

world server to another.

- Consider the possibility of moving inventory (IAR files) from one virtual world server to another.
- Consider using software designed to backup owner created inventory items (and transfer to another virtual world).
- Look for existing virtual world objects, IAR and OAR files that may meet your learning needs.
- Consider sharing/collaboration with other educators/institutions to share virtual world learning environments and resources.

Research: USB OpenSim



Installing and running OpenSim on a USB memory stick to run on a Windows PC (without HyperGrid)

SCREENCAST: [OpenSim on a USB Stick](#)(Steps 1-5 18 mins)SCREENCAST: [OpenSim on a USB Stick - Part 2](#)(Wifi, OAR files and Diva Inventory 4.5 mins)

See feedback and video: [iliveis - OpenSim for free! on a stick](#)

This OpenSim on a USB Memory Stick installation does not allow multi user access but may be useful for

- students without internet access at home
- institutions where online access to virtual worlds is not available
- conferences and workshops

Note: Slightly different instruction below for **running USB OpenSim on 64bit Windows PCs**.

Instructions

Download [MoWeS Portable](#) using [MoWeS Mixer](#)

- Select '**I do not have a MoWeS Portable II Package**'
- Select **Apache2, MySQL5** and **PHP5**
- Download, Unzip and copy **contents of mowes-portable** in a new folder **usb-opensim** on a clean USB memory stick

Download Diva Distribution [Preconfigured hypergrided standalone](#)

- Unzip and copy diva-rxxxxxx folder to **usb-opensim** on same USB memory stick (rxxxxxx is currently r13861)
- Follow the [Diva installation instructions](#)with **amendments and notes below** for using USB on a

Windows PC

Amendments and notes for Diva instructions

From USB

Step 0 (ignore)

Step 1

- Run **mowes.exe** - follow all prompts
- You should get a **MoWeS Portable II Status Window** showing **Apache and MySQL both running**
- **Open mysql --> bin** folder - then for Windows Vista/Win 7 **<SHIFT><RIGHT MOUSE CLICK>** --> '**Open command window here**' (mouse needs to be in white space on far RHS of window) or Google to find how to open command line window for other versions of Windows ([Windows XP here](#)).
- Follow Diva [MySQL instructions](#)
- At password prompt hit **<ENTER>** (ie no password)
- At mysql prompt continue to follow mysql.txt noting that **all punctuation is essential** and choosing your password (including ' ')
- (If mysql prompt is lost type **help**; - you probably left off a semicolon :-)
- Close command window

Step 2 (ignore)

- we will use <http://127.0.0.1:9000> (because we are local machine only and not activating HyperGrid)

Step 3 (ignore)

- no need for email for standalone USB OpenSim

Step 4

- Follow [instructions](#) and run **configure.exe** from bin folder
- at Your external domain name (preferred) or IP address: type **127.0.0.1**
- accept all remaining default options
- Note settings before closing command window by pressing **<ENTER>** as requested

Step 5

- Follow [instructions](#) and run **opensim.exe** from bin folder (this will take a few minutes)

- Remember avatar name and password
- At Region <root> # prompt all is ready

Tidy up...

- At Region <root> # prompt type **terrain fill 21** (creates flat land above waterline)
- At Region <root> # prompt type **quit** and wait for window to close
- Go to MoWeS Portable II Status Window and **Stop servers** and **End**
- Create shortcuts from the USB root directory to usb-opensim\mowes.exe and usb-opensim\diva-rxxxxx\opensim.exe (xxxxxx is currently r13861)

Running USB OpenSim

- Run mowes.exe - and when both servers are running...
- Run opensim.exe - and when Region <root> # prompt appears... (On **64bit Windows PCs** run **OpenSim32BitLaunch.exe** - see [Adam Frisby: Running OpenSim under a 64bit environment](#))
- Open an OpenSim compatible viewer (**Imprudenceor Hippo** recommended - or see [OpenSim](#))
- Select Grid **localhost** (connects to loginuri <http://127.0.0.1:9000>)
- Enter avatar names and password (from Step 5 above)
- Optional - for **user management** open a browser and go to <http://127.0.0.1:9000/wifi> (create/edit/delete users...)

EXTRAS

Instructions to put on USB

- Running OpenSim:  [Running OpenSim on USB Memory Stick.pdf](#)

Importing a new terrain and building (optional)

- Download [CondensationLandClub](#) and Unzip
- In Opensim.exe command window at Region <root> # prompt type **load oar CondensationLandClub.oar**
- Go to viewer and wait for terrain and building to rez

Installing Imprudence Viewer on same USB

- [Download Imprudence](#) (It has some [nice features](#))
- Run and change install directory to **usb-opensim** folder
- Copy shortcut to root directory
- Ready to use from USB

Making multiple copies of USB

- Copy entire contents of USB to a folder on PC
- Copy contents of folder from PC to a new USB

Troubleshooting

- Occasionally run DIVA --> bin --> **Update.exe** (while mowes and opensim are running) to update DIVA/OpenSim (all existing data is saved)
- If **shortcuts** to mowes.exe and opensim.exe don't work open folders (drive mapping can interfere)
- If **OpenSim.exe closes** on startup check to see if you are on a 64-bit PC. If so run OpenSim32BitLaunch.exe instead.
- If MoWeS gives "**Apache not running**" error then turn off Skype if it's running. (See [this link](#) for a fix.)
- For other **MoWeS errors** [try here](#)
- Some PCs **may not run** [this build of OpenSim for other reasons](#) which is beyond the scope of this project.

Recommendations for possible Guidelines/Standards

- Consider using OpenSim on a USB memory stick as a 'portable' virtual world where other access may not be possible or desirable.

Research - Voice

Some ICT service departments/teams will not open firewalls to allow in-world voice communication due to security concerns.

There are some other options to use voice if necessary.

[Skype](#) (or an alternative VOIP service if available through the firewall) can provide voice and other functionality in parallel with the virtual world. Some virtual worlds have 'Skype Badges' or other scripted tools to facilitate in-world dialogue with nearby avatars (eg Reaction Grid shown in this picture)



If voice is not possible within an institution consider using voice from home.

Some institutions use alternative proxy/Internet software to overcome security concerns with voice. This solution may not be viable for some institutions due to policy or cost issues and may involve some additional expensive customisation. One institution currently uses a proxy server with a customised IMS ([CAAB](#)) and a [CISCO Service Control Engine](#) that gives users access to voice in Second Life - as well as web services that do not use an authenticated proxy service.

For local/hosted OpenSim worlds without voice consider using [Mumble](#) and [Murmer](#) or [Whisper](#)
For more information see [Whisper - New Voice Solution for OpenSim](#)

Recommendations for possible Guidelines/Standards

- If voice is required consider using Skype for voice, both for in-world communication and to support remote training.
- Consider arranging sessions for when students are at home and can use voice if they have adequate access.

Research - Volatility

Volatility and Investment of Resources

Research by [KZERO](#) and others shows how rapidly new virtual worlds are developing and also the number that have ceased to exist.

Some virtual worlds have enjoyed some longevity such as as [Active Worlds](#) which started 15 years ago.

Issue: How much time and money is worth investing in establishing 3D immersive environments, organising professional learning and developing learning resources if virtual worlds regularly change or are superseded?

Establishing virtual worlds

While there is a reasonably high degree of risk that a particular virtual world may no longer be continued or supported in the near future this needs to be considered together with a number of other factors such as

- the anticipated length of time that the 3D learning environment or resource might be useful - teachers and learners often decide to develop new environments or resources based on newly developed skills and emerging understanding of the affordances that 3D environments bring
- it may be better to use existing virtual worlds or collaborate with others who have virtual worlds rather than establish a new one
- the experience gained in using a 3D virtual world may far outweigh the costs in moving to a new virtual world with that new experience

Investment in professional learning

As long as virtual worlds are chosen that use most of the standard tools and have the most common elements of user interfaces most professional learning is transferable to new virtual worlds.

Investment in learning resources

Efficient and effective use of learning resources can maximise the investment of time and money. For example

- Focussing on learning processes and outcomes with existing or easily developed resources means that little will be lost if resources can't be exported to a new virtual world.
- Working within collaborative educational communities that share resources.
- Facilitating student participation in building learning resources - this is something many virtual worlds are designed to do

Mitigating strategies for an institution

- Build experience in more than one virtual world platform
- Actively collaborate with other institutions - sharing environments, resources, professional learning...
- Join professional virtual world (immersive learning) networks to keep up-to-date with developments and trends
- Avoid the temptation to invest heavily in particular builds - needs, ideas and software features will change

Recommendations for possible Guidelines/Standards

- Build skills in whatever virtual world meets your needs now because much of the knowledge and skills gained will be transferrable to other and newer immersive environments.
- Join communities of educators using virtual worlds to keep an eye on trends.